WHAT IS CLAIMED IS:

1. A hybrid electric vehicle comprised of:

a drive train;

an electric motor for driving said drive train;

a power unit electrically coupled to said electric motor;

an electric energy storage system electrically coupled to said electric motor; and

wherein said power unit and said electric energy storage system provide electricity to said electric motor for powering said vehicle; and

a power management controller programmed to control output power of said power unit to maintain said energy storage system between a predetermined high voltage set-point and a predetermined low voltage set-point.

2. A hybrid electric vehicle according to claim 1 wherein said power unit is an engine in combination with a generator.

3. A hybrid electric vehicle according to claim 1 wherein said motor derives power from said energy storage system and said power unit during acceleration when said motor requires power below a predetermined average power level.

4. A hybrid electric vehicle according to claim 1 wherein said power management controller is programmed to drive said motor by said electric energy storage system when said motor requires power above a predetermined average power level.

5. A hybrid electric vehicle according to claim 1, further comprising:

an electric bus connected to both the power unit and the electric energy source and where the voltage across the electric bus is substantially the same as the voltage across said electric

energy source so that a change in voltage of the electric bus results in the same change to the voltage across the electric energy source.

6. A hybrid electric vehicle according to claim 1 wherein said power management controller is programmed to allow the power unit to recharge said electric energy storage system when power required by said electric motor is below a predetermined level.

7. A hybrid electric vehicle according to claim 1 wherein said power management controller is programmed to determine an optimum engine speed of said power unit for said predetermined set-points, and wherein said power management controller is adapted to control said power unit to said optimum engine speed.

8. A hybrid electric vehicle according to claim 7 wherein said power management controller is programmed with a speed load curve to produce power at the point of lowest emissions and greatest fuel economy.

9. A hybrid electric vehicle according to claim 1 wherein said energy storage system is a bank of ultracapacitors.

10. A hybrid electric vehicle according to claim 1 wherein said power management system is programmed with a control algorithm to maintain an energy storage system voltage within a predetermined range.

11. A hybrid electric vehicle according to claim 10 wherein said predetermined range is maintained by varying the output of said power unit.

12. A hybrid electric vehicle according to claim 10 wherein said control algorithm is a inversely proportional ratio of vehicle speed to energy storage system voltage (speed to voltage

ratio) to achieve the optimal system performance and wherein said power drawn from said power unit is adjusted to substantially achieve the desired speed to voltage ratio.

13. A hybrid electric vehicle according to claim 12 wherein said power management controller is set with an average power unit level, and when in a cruise mode power is only drawn from said energy storage system when the power level of said power unit is above said average power unit level.

14. A hybrid electric vehicle according to claim 1 further comprising:

a two-gear gearbox coupled to said electric motor and said drive train.

15. A hybrid electric vehicle according to claim 1 further comprising:

an auxiliary motor in electrical connection to said power unit and said electric energy storage system for driving accessory vehicle components.

16. A hybrid electric vehicle according to claim 1 wherein said electric motor is a low induction motor capable of delivering rated torque and power at said predetermined low voltage set-point.

17. A hybrid electric vehicle according to claim 1 wherein said power unit is comprised of:

an engine; and

generator coupled to said engine.

18. A hybrid electric vehicle according to claim 1 wherein said energy storage system is an ultracapacitor bank, and wherein said power management controller runs the output of said power unit at said predetermined average power level when said energy storage system is at a predetermined range between said high and low voltage set-points, said range having a low threshold point and high threshold point.

19. A hybrid electric vehicle according to claim 18 wherein said power management controller initiates an increase in the output of said power unit when the energy level of said energy storage system falls below the low threshold point of said range.

20. A hybrid electric vehicle according to claim 19 wherein said power provides substantially all of the power when said energy storage system is at the low voltage set-point.

21. A hybrid electric vehicle according to claim 20 wherein said power management power controller is programmed to control motor output to prevent said power unit from running above maximum-rated power.

22. A hybrid electric vehicle according to claim 18 wherein said power management controller initiates a decrease in the output of said power unit when the energy level of said energy storage system reaches the high threshold point of said range.

23. A hybrid electric vehicle according to claim 18 wherein said average power level of said power unit is adjusted during operation of said electric vehicle to optimize fuel economy.

24. A hybrid electric vehicle according to claim 18 wherein said power management controller is programmed to proportionally decrease the output of said power unit to maximize fuel economy and to hold said storage system at said predetermined low voltage set-point when said power management system receives a decelerate signal.

25. A hybrid electric vehicle according to claim 24 wherein said ultracapacitors are recharged inversely proportionally to vehicle speed during deceleration.

26. A hybrid electric vehicle according to claim 18 wherein said power management controller is programmed to initiate production of a reverse motor torque signal proportional to the deceleration desired when a brake signal is received by said power management controller.

27. A hybrid electric vehicle according to claim 26 wherein said power management system allows recharging of said ultracapacitors during braking and wherein output of said power unit is reduced to a minimum during recharging.

28. A hybrid electric vehicle according to claim 1 wherein the difference between set predetermined high and low voltage points is 230 volts.

29. A hybrid electric vehicle according to claim 1 wherein said power management controller is a laptop personal computer.

30. A hybrid electric vehicle according to claim 1, further comprising:

a data acquisition component in electrical communication with said power management controller adapted to collect engine speed data, motor speed data, vehicle speed data, temperature data, motor current, generator current, acceleration commands, deceleration commands, braking commands.

31. A hybrid electric vehicle according to claim 1 wherein said power management controller is adapted to issue output commands to control motor torque, generator voltage and current, engine speed, engine power, and shift commands for transmission equipped vehicles.

32. An electric vehicle power management system comprising:

an electric motor;

a power unit electrically coupled to said electric motor;

an ultracapacitor electrically coupled to said electric motor; and

wherein said power unit and said ultracapacitor provide energy to said electric motor for powering said vehicle;

a power management controller that is adapted to store a predetermined average power level for said power unit, and wherein said power management controller is programmed to

control output power of said power unit to maintain said ultracapacitor between a predetermined high voltage set-point and a predetermined low voltage set-point;

wherein said power management controller runs the output of said power unit at said predetermined average power level when said ultracapacitor is in a predetermined range between said high and low voltage set-points, said range having a low threshold point and high threshold point;

wherein said power management controller is adapted to increase the output of said power unit when the energy level of said ultracapacitor falls below the low threshold point of said range; and

wherein said power management controller is adapted to decrease the output of said power unit when the energy level of said ultracapacitor reaches the high threshold point of said range.

33. A power management system according to claim 32 wherein said power unit is comprised of an engine coupled to a generator and wherein engine speed is varied proportionally to the variance with the output of the power unit.

34. A hybrid electric vehicle comprised of:

a drive train;

an electric motor for driving said drive train;

an engine for driving said drive train;

an electric energy storage system electrically coupled to said electric motor; and

wherein said engine and said electric energy storage system power said vehicle; and

a controller programmed to control said engine to vary output power of said engine to meet power requirement and to substantially maintain said energy storage system between a predetermined high voltage set-point and a predetermined low voltage set-point.

35. A hybrid electric vehicle according to claim 34 wherein said controller is programmed to allow the motor to recharge said electric energy storage system when engine power is below a predetermined level.

36. A hybrid electric vehicle according to claim 34 wherein said controller is programmed to substantially maintain a predetermined ratio of vehicle speed to energy storage voltage (speed to voltage ratio).

37. A hybrid electric vehicle according to claim 36, wherein fuzzy logic algorithms are used by said controller to adjust the speed to voltage ratio.

38. A hybrid electric vehicle according to claim 36, wherein said power drawn from said engine is adjusted to substantially achieve the desired speed to voltage ratio.

39. A hybrid electric vehicle according to claim 36, wherein said motor acts as a generator when said speed to voltage ratio is higher than a predetermined level.

40. A hybrid electric vehicle according to claim 39, wherein generation of voltage levels in said electric energy storage system by said electric motor rises inversely proportional to vehicle speed.

41. A hybrid electric vehicle according to claim 34 wherein said controller increases engine output to match required output when said electric energy storage system falls near said predetermined low voltage set-point.

42. A hybrid electric vehicle according to claim 34 wherein said controller is programmed to produce traction power from said electric energy storage system when in a cruise mode only when engine power is above a predetermined power level.

43. A hybrid electric vehicle according to claim 42, wherein said predetermined power level is adjusted during vehicle operation by said controller.

44. A hybrid electric vehicle according to claim 34 wherein said drive train may be place in the neutral position by said controller so that said motor can operate as a generator to recharge the electric energy storage system.

45. A hybrid electric vehicle according to claim 36 wherein said vehicle may be operated in a cruise mode wherein said controller is programmed to control said motor to recharge said electric energy storage system when said engine is below a predetermined power level and when said speed to voltage ratio is higher than desired.

46. A hybrid electric vehicle according to claim 34 wherein said vehicle is a series configuration hybrid electric vehicle.